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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/714,266	11/17/2000	Shingo Hayakawa	35.C14930	5165

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EXAMINER

CURTIS, CRAIG

ART UNIT PAPER NUMBER

2872

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/714,266	Applicant(s) HAYAKAWA, SHINGO	
	Examiner Craig Curtis	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2004.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18-24, 26-35 and 37-41 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-16, 18-24, 26-35 and 37-41 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Disposition of the Instant Application

- This Office Action is responsive to Applicant's Amendment filed on 28 September 2004, which has been made of record in the file.
- By this amendment, Applicant has canceled without prejudice claims 17, 25, and 36, and has amended claims 1-5, 11-13, 16, 18-20, 22-24, and 26-35.
- Accordingly, claims 1-16, 18-24, 26-35, and 37-41 are presently pending in the instant application.

Claim Objections

1. **Claims 1-16, 18-24, 26-35, and 37-41 are objected to because of the following informalities:** Where Applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description **MUST clearly redefine the claim term** and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the Applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term “**optic axis**” recited in these claims (e.g., in line 8 of claim 1, line 5 of claim 3, line 14 of claim 16, line 14 of claim 22, etc.) is used in these claims to mean “optical axis,” while the accepted meaning of optic axis is “[a] direction through a birefringent (aka doubly refracting) crystal along which double refraction does not take place; a uniaxial crystal includes one optic axis, whereas a biaxial crystal has two.” See *The Photonics Dictionary*TM. The accepted meaning of the term “optical axis,” on the other hand, is “[t]he line passing through both the centers of

curvatures of the optical surfaces of a lens or other optical element(s); the optical centerline for all the centers of a lens system or other optical system.” The Examiner respectfully apprises Applicant that, in his opinion, Applicant cannot clearly redefine the term “**optic axis**” to mean “**optical axis**” without doing injustice to each of these *long-established* and *quite distinct terms of art*.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-5, 22-24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (JP409211222A) in view of *Refraction* (as set out in *The Physics Hypertextbook* @ <http://hypertextbook.com/physics/waves/refraction>).**

With regard to claim 1, Inoue et al. disclose the invention as claimed—[a]n optical low-pass filter [N.B. The recitation “optical low-pass filter” has not been given patentable weight because the recitation occurs only in the preamble and thus is a so-called *intended use* limitation. More specifically, a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the *intended use* of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).] comprising:

at least one birefringent plate (any one of at least plates 21, 23, and 25 in Fig. 2) made of a birefringent material, wherein said filter satisfies $10^0 < \theta < 27^0$, where θ is the angle an optic axis of said at least one birefringent plate makes with a normal to a surface of said at least one birefringent plate (see line 6 in **SOLUTION** section of English abstract; also see depiction of θ in Fig. 2)—**EXCEPT FOR** explicit teachings of the following additionally recited claim limitations:

wherein said at least one birefringent plate is made of a uniaxial crystal and has a refractive index difference of not less than 0.02 for ordinary and extraordinary rays.

The use of uniaxial birefringent materials having refractive index differences of not less than 0.02 for ordinary and extraordinary rays in the optical arts, however, is notoriously old and well known. See, e.g., calomel, rutile, and zircon (high and low)--uniaxial crystals all, each having a refractive index difference [read: birefringence] of not less than 0.02 for ordinary and extraordinary rays (viz., 0.683, 0.287, 0.055, and 0.047, respectively), as set out on page 6 in *Refraction*. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have prepared the birefringent plate of **Inoue et al.** such that be made out of a single uniaxial crystal having a birefringence of not less than 0.02, as evidenced by the above-recited disclosures in *Refraction*, for at least the purpose of achieving a desired birefringent effect.

With regard to claim 2, the combination meets this teaching, provided, of course, that Applicant reckons birefringence, δ , as $\delta = n_o - n_e$ (in which case, lithium niobate would have a birefringence of 0.085). If this is not the manner in which Applicant reckons birefringence (i.e., if, instead, Applicant reckons birefringence as $\delta = n_e - n_o$, Applicant **MUST** explicitly disclose

how lithium niobate can be used as the birefringent material recited in claim 1 and still satisfy the "...not less than 0.02..." birefringence requirement recited therein). This teaching by the combination also meets the limitations recited by Applicant in **claims 22 and 23**, especially when it is appreciated that one could readily define *an* optic axis so as to satisfy the limitations recited in these claims.

With regard to claims 3 and 4, Inoue et al. disclose first and second birefringent plates (any two from among birefringent plates 21, 23, and 25 in Fig. 2), it being submitted that the orthogonal projection limitations set out in these claims are met by the birefringent plates depicted in, e.g., Fig. 2, in the same manner as that presently set out in the claims, it being possible to define *an* optic axis so as to satisfy the limitations recited in these claims.

With regard to claims 5 and 24, the provisioning of dielectric thin-film anti-reflective coatings is notoriously old and well known in the optical art, and as such amounts to an obvious design choice.

With regard to claim 26, the combination additionally discloses a third birefringent plate (e.g., 25 in Fig. 2 of Inoue et al.).

With regard to claims 27 and 28, compare the relative thicknesses of plates 22, 25, and 21, depicted in Fig. 2 of Inoue et al., with respect to one another. Please amend claim 27 such that $D1 = D3 > 2$ read as follows: $D1 = D3 > D2$.

3. Claims 6-15, 29-35, and 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (JP409211222A) in view of *Refraction* (as set out in *The Physics Hypertextbook* @ <http://hypertextbook.com/physics/waves/refraction>), as applied above to claims 1-5, 22-24, and 26-28, and further in view of Oono (6,724,531).

With regard to claim 6, the combination discloses the claimed invention as set forth above **EXCEPT FOR** an explicit teaching of an image sensing element inserted in an optical path of photographing light guided to said image sensing element.

Oono, however, discloses an image sensing element (20 in Fig. 1) in front of which is inserted an optical low-pass filter (10) in an optical path of photographing light guided to said image sensing element. See Fig. 1. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of the combination such that it further include an image sensing element, as explicitly taught by Oono, for at least the purpose of, for example, gauging proper system alignment.

With regard to claims 7-15, although the combination fails to disclose explicitly wherein, e.g., said image sensing element and said optical low-pass filter are integrated, wherein said optical low-pass filter is directly adhered to said image sensing element, etc., it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of the combination such that, e.g., said image sensing element and said optical low-pass filter be integrated, for at least the purpose of decreasing reflection losses, because it has been held that forming in one piece an article that has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

With regard to claims 29-35 and 37-41, please see the teachings by the combination of the limitations recited in these claims as set forth hereinbefore.

4. Claims 16 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oono (6,075,581) in view of Inoue et al. (JP409211222A) and *Refraction* (set out in *The Physics Hypertextbook* @ <http://hypertextbook.com/physics/waves/refraction>), and Shirochi (6,075,581).

With regard to claim 16, Oono discloses the invention as claimed—an image sensing unit comprising: an image sensing element having a rectangular image sensing surface (20 in Fig. 1); and

at least one birefringent plate (any one plate from among birefringent plates 4, 5, and 6) that is inserted in an optical path of photographing light guided to said image sensing element and is made of birefringent material—**EXCEPT FOR** explicit teachings of the following additionally recited limitations:

wherein said at least one birefringent plate is made of a single uniaxial crystal having a refractive index difference (read: birefringence) of not less than 0.02 for ordinary and extraordinary rays (please see, however, the teachings set forth above with respect to same by **Inoue et al.** in view of *Refraction*);

wherein said unit satisfies:

$$0.015 < p/d < 0.045,$$

where d is the thickness of said at least one birefringent plate, and p is the pixel pitch of the image sensing surface in a long side direction.

Shirochi, however, provide an explicit teaching of an image sensing unit (see Fig. 4) that satisfies $0.015 < p/d < 0.045$, where d is the thickness of said at least one birefringent plate, and p is the pixel pitch of the image sensing surface in a long side direction. Please see col. 9, ll. 56-

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61, where d is taught as being 0.453 mm and p as being 17.5 μm , resulting in a p/d ratio of 0.0386. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of **Oono** in view of **Inoue et al.** and **Refraction** such that said unit satisfy the recited range of $0.015 < p/d < 0.045$, as taught by **Shirochi**, for at least the purpose of suppressing aliasing (aka Moiré) effects.

With regard to claim 18, please see above, esp. birefringent plates 21, 23, and 25 in Fig. 2 of the **Inoue et al.** reference.

With regard to claims 19-21, please see the above-recited teachings of the limitations respectively recited in these claims by the references of the combination.

Response to Arguments

5. Applicant's arguments filed 28 September 2004 with respect to claims 1-16, 18-24, 26-35, and 37-41 have been considered but are moot in view of the new ground(s) of rejection set forth hereinbefore.

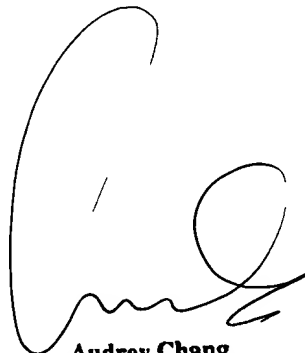
Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Curtis, whose telephone number is (571) 272-2311. The examiner can normally be reached on Monday-Friday, 9:00 A.M. to 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached at (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.H.C.
Craig H. Curtis
Group Art Unit 2872
6 December 2004



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